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television service provider" refers to entities that provide television service delivery systems. The term "subscriber" refers to any individual, household or other entity that receives television service delivery from a television service provider. In almost all possible television service delivery systems other than land based antenna broadcast, the subscriber actually enters into a service contract with the ~~television~~ television service provider in order to subscribe to the television service. In land-based antenna service, anyone with a television in the geographic area reached by the antenna can receive the television service without any contract with the broadcaster. Nevertheless, in this specification, the term subscriber is intended to include such entities.

An electronic program guide is a listing which can be displayed on the monitor (e.g., television) of a subscriber that displays a listing of the programs that are being offered on the various television channels of the system.

Most contract-based television service delivery systems, such as analog cable, digital cable, digital broadcast satellite (DBS), and switched digital video (SDV), include an EPG.

Normally, individuals receiving their television service via radio frequency broadcast using earth-based antennae do not have access to an EPG since there is no centralized television service provider, but rather, they simply receive whatever signals are being broadcast in their geographic by individual television stations (i.e., individual television channels). However, it certainly is possible for a broadcaster to broadcast

an EPG showing the programming available through land-based antennae broadcast in a particular geographic area on one of the otherwise unused radio frequency broadcast channels received for television.

5           In analog cable television networks, the EPG is typically provided in one of the channels and comprises a scrolling screen showing the television program channels available through the cable network presently and for the next few hours on those channels.

10           In more recently developed television service delivery systems such as digital cable, SDV and DBS, the EPG also may be received in one communication channel of the ~~television~~  
television service transport stream. In other systems, EPG data  
15           for a certain amount of time (e.g., one week) may be downloaded intermittently to a memory at the subscriber node and the  
interaction would be between the subscriber and the local  
memory.

          Many EPGs are interactive such that a subscriber might be able to select a particular item in an EPG using his remote  
20           control unit in order to be provided additional information pertaining to that item. For instance, a user may position a cursor over an icon for a particular channel in order to obtain the programming information for that particular channel.

          Normally, in the EPG, only a portion of the viewing area of  
25           the EPG is consumed with programming information. Typically, a portion of the screen is reserved for advertising.

Particularly, one or more windows in the screen display advertisement which may comprise still picture advertising as

real time from a remote node of the ~~television~~ television service delivery network at the time of display.

In either case, an EPG ad queue can be maintained in RAM at the addressable unit, the queue containing an ordered list of advertisement identifiers. The advertisement identifiers may  
5 comprise URLs on the World Wide Web.

The EPG itself also may be Internet based and delivered to the addressable units in the same manner as the ads, e.g., through the Internet.

10 Delivery of the advertisements and/or EPG may be through a separate transport stream than the television programming transport stream. For instance, in digital cable and SDV, one of the channels in the transport stream may be dedicated to Internet access or even just advertising via Internet access.  
15 In analog cable, the Internet based advertisements and/or EPG may be retrieved through a DOCSIS (data over cable) channel carried on the cable using a DOCSIS modem in the subscriber set-top box. In DBS systems, the advertisement may be provided through a channel transmitted from the satellite itself or  
20 through a completely separate transport stream, for example, the telephone lines.

The addressable units can be preprogrammed to download and organize the advertisement identifiers in the queue in accordance with a predetermined scheduling algorithm.  
25 Alternately, they may be programmed to receive scheduling instructions intermittently from a head end. The scheduling algorithms can include the order in which the ads will be

displayed, the position of the ads in the EPG (if the EPG supports multiple, simultaneous ad windows), and the duration that the ads will be shown.

Preferably, the scheduling algorithm determines when the EPG is being displayed and displays advertisements only when the EPG is being viewed.

The advertisements may comprise streaming video and/or streaming audio files embedded within Internet based files.

## 10 **Brief Description of the Drawings**

Figure 1 is a diagram of an EPG.

Figure 2 is a block diagram of an exemplary set top box in accordance with the present invention.

Figure 3 is a flow diagram illustrating the steps involved in downloading EPG advertisement queue in accordance with an embodiment of the present invention.

~~Figure 4 is a flow diagram illustrating the steps involved in inserting advertisements into the EPG in accordance with an embodiment of the present invention.~~

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## **Detailed Description of the Invention**

Figure 1 is a screen shot of a typical EPG 100. It comprises an area (or window) 101 for displaying program information for the multiplicity of channels of television service provided by the television service provider. It further includes one or more windows 103, 105, 107 for displaying advertisements in the EPG. The advertisements may be static (in

assumed that no one is viewing the EPG even if the television is on and the EPG channel is tuned in if a certain amount of time has elapsed since a remote control command has been received by the set top box.

5           Furthermore, there are several means by which it may be determined whether the TV monitor is on. For instance, if the television is plugged into a power outlet of the set top box, the set top box can simply detect whether sufficient current is running to the television to indicate that it is on.

10          Alternately, a horizontal oscillator detector can be incorporated into the set top box and used to provide a probabilistic determination of whether there is a TV on in the vicinity of the STB by detecting horizontal oscillation output of a typical television. Another potential method is to provide

15          a detector for detecting the high voltage chroma subcarrier common to an operating television. U.S. Patent Application No. 09/731,605—~~(Attorney Docket No. P-24,475)~~ entitled

**"Method and System for Addressing Targeted Advertisements Using Detection of Operational Status of Display Device"**, invented by

20          John Blasko et al., filed on ~~or about~~ December 7, 2000, and assigned to the same assignee as the present application discusses various methods and apparatus for detecting when a television is on for targeted advertising purposes and is incorporated herein by reference.

25           In at least one embodiment, the identity and order of the ads which are to be displayed in the advertising portions of the EPG screen are stored in a queue in RAM at the addressable unit.

performed by the channel processing circuit 222 is the insertion of the ads into the EPG. Other exemplary functions that might be performed in the channel processing circuit 222 include decoding and encoded data streams (e.g., MPEG, Dolby SurroundSound™). The channel processing circuit 222 may take any reasonable form. It should be understood that the term circuit is used in this specification inclusively to encompass analog circuits and digital circuits, including finite state machines, digital signal processors, computers, central processing units, ASICs, and programmed general purpose processors. Most likely, the channel processing circuit is a digital processor and, in fact, may comprise the same processor that comprises the SCU 204.

If any of the data received from the input port 202 is to be stored locally at the STB, the channel processing circuit 222 can pass that data to one of the memory devices 212 or 214 for storage through the system control unit 204.

The output of the channel processing circuit 222 typically is coupled to a de-multiplexer 224 which separates the audio and video portions of the channel and forwards them to audio and video output ports 226 and 228, respectively. These ports normally would be coupled to the audio and video input ports, respectively, of the subscriber's television.

In the particular embodiment illustrated in Figure 2, the advertisements for insertion in the advertisement areas of the EPG are received via a different transport stream from the television programming channels and, particularly, via the

Internet through the telephone lines ~~229~~ 232 and a modem 230.

It should be understood by persons of skill in the art that this is merely an example and that the advertisements, ARLs and queue organization instructions may be received by other means, such as in a dedicated channel in the main transport mechanism 201.

The STB further includes a subprocessor 234, coupled between the modem 230 and the SCU 204. In this particular embodiment, the advertisements, ARLs and instructions for organizing the queue are received via the Internet via modem 230. The sub-processor 234 is dedicated to processing Internet based files, running file transfer protocol (FTP) for receiving streaming audio, streaming video and other files, receiving instructions from the head end for schedule generation in accordance with the instructions received from the head end. In this embodiment, we will assume that the advertisements are downloaded ahead of time and stored locally in memory 214 for retrieval at the time of insertion. Accordingly, modem 230 receives Internet based files. They are processed in the subprocessor 234 and stored in the large volume memory 214. Modem 230 also receives ARLs and instructions for generating a schedule for EPG ad insertion. As previously noted, the ARLs may comprise URLs on the World Wide Web.

The exact manner in which ads, ARLs and/or instructions are received can take many forms. For instance, the modem may connect directly via the telephone lines to a server maintained by the television service provider to retrieve such information. Alternately, the modem may be connected to an Internet service

provider (ISP) and the modem can connect to the television service provider's Internet server via the Internet. If the modem is coupled to a dedicated line, the server may simply send instructions, ads and ARLs addressed to the particular STB at  
5 predesignated intervals. If the modem is connected to a non-dedicated line, the STB may be programmed to call in to the server (whether through the Internet or directly) at predetermined intervals to request a download of such information. Aforementioned U.S. Provisional Patent Application  
10 No. 60/229,156 and U.S. Patent Application No.

          09/712,790, filed on ~~or about~~ November 14, 2000, entitled "Queue Based Advertisement Scheduling and Sales", invented by Charles Eldering and Gregory Flickinger, disclose even further possible methods and apparatus for delivering ads,  
15 ARLs and instructions to the STBs.

In order to display the ads in the EPG, the subprocessor 234 and/or the main SCU 204 consults the schedule in order to determine what ads are to be displayed when and where in the EPG. The ads are then retrieved, e.g, via the Internet in real  
20 time or from the local memory, and are forwarded to the channel processing circuit 222. The channel processing circuit then inserts the ads into the EPG.

In accordance with the present invention, it may be desirable for the STB to send information to the head end  
25 indicating when an advertisement has been displayed in the EPG so that the television service provider can bill the advertiser for having shown the ad. In such a case, the modem 230 could be



used for transmitting as well as receiving through port 232. In this particular embodiment, the system control unit 204 can transmit information upstream through subprocessor 234, modem 230 and port 232.

5        Figure 3 is a flowchart illustrating one exemplary process flow for receiving EPG advertisements, ARLs, and the information/instructions for organizing the queue. In step 301, ARLs, instructions for organizing the ARLs and the queue and advertisements are received via the modem 230. In step 303, the  
10        ads are stored to the large memory 214. In step 305, the instructions for organizing the queue are processed to create a queue comprising a list of ARLs and designating an order in which the ads corresponding to the ARLs are to be displayed.

      This process may be repeated at particular intervals, e.g.  
15        every week. In one embodiment, the EPG advertisement queue may be completely rewritten at these intervals. In other embodiments, new ARLs may simply be added to the queue while any ARLs corresponding to advertisements which have not yet been displayed remain in the queue.

20        ~~Figure 4 is a flowchart illustrating ad insertion in accordance with one particular embodiment of the invention. In this embodiment~~ According to an exemplary embodiment of the present invention, the ads are retrieved and displayed only when it is determined that the set top box has tuned in to the EPG  
25        channel. ~~Accordingly, the p~~Processing illustrated in the flow chart of ~~Figure 4~~ is commenced at step 402 upon an indication that the EPG has been tuned in. This may be indicated by an interrupt signal or a flag being set in a manner well known in

the art. ~~In step 404, the~~ EPG is displayed. ~~In step 406, The~~  
subprocessor 234 consults the schedule to determine what ad or  
ads should be displayed in what windows in the EPG and for how  
long. ~~In step 410, the~~ ads are then retrieved, such as from  
5 the local memory or from a remote server as the case may be. ~~In~~  
~~step 410, the~~ ads are next inserted into the EPG.

In this example, we will assume that the television service  
provider has arranged with the advertisers to display the ads  
for a particular period of time that the EPG channel is tuned  
10 in. Accordingly, ~~in step 414, a~~ timer is started corresponding  
to each ad that is being displayed. ~~In step 414, it~~ is  
determined whether the total display period for each ad has been  
reached. If so, ~~flow proceeds to step 414 in which~~ the queue is  
updated. In a simple embodiment, this simply may involve  
15 deleting the ARL for the ad that was just displayed. ~~Flow then~~  
~~proceeds to step 420, in which~~ Then the fact that the ad was  
displayed is reported back to the television service provider.  
This may involve immediately sending the information upstream to  
the head end via the modem. In other embodiments, it may  
20 involve writing this data to a storage location in local memory,  
for sending upstream, along with the contents of other related  
storage locations, at a later time. ~~In step 421, the~~ counter  
for that ad is reset. Flow then returns to ~~step 406 the~~  
subprocessor 234 where the queue is consulted again to determine  
25 what advertisement should be inserted in place of the one just  
removed.

If, on the other hand, ~~in steps 416, no~~ ads have timed out,  
the the flow proceeds to ~~step 422 where it is determined~~ if the  
EPG is

still tuned in. If yes, the process continues ~~flow proceeds~~  
~~back up to step 416 and loops through steps 416 and 422 (with a~~  
~~possible detour to steps 418-420 et seq.)~~ until the EPG is tuned  
out. At that point, ~~flow proceeds from step 422 to step 424~~  
5 ~~where~~ the timers are stopped and stored in memory for retrieval  
when the EPG is next tuned in.

The invention allows advertising to be delivered  
independently from the EPG and in formats, e.g., HTML, streaming  
video, different from the EPG. This allows for the possibility  
10 of more individually targeting advertisements than may be  
available through direct incorporation into the EPG stream.

For instance, the invention can be used with an analog  
cable system having no addressability in connection with the  
television program and EPG transport stream. The ads can be  
15 downloaded through an entirely different transport mechanism  
that allows for individual STB addressability.

Further, in situations where the ads are not stored  
locally, but are retrieved via the Internet or through a direct  
connection over the telephone lines or any other network, the  
20 ads can be updated by the advertiser on their own server and  
thereafter be immediately available for display to the  
subscriber(s) the next time the subscriber tunes in the EPG.  
Further, in such embodiments, the subscriber need not have  
memory suitable for storing ads.

25 In addition to simple HTML files, the ads may also include  
streaming audio and/or streaming video, which, depending upon  
the bandwidth of the subscriber's connection can also be